

REMARKS

In response to the Final Office Action mailed May 14, 2007, the Examiner rejected claims 1-6, 9-14, 16-30, 32-42, 45-50, and 52-60 under 35 U.S.C. §103(a) as unpatentable over U.S. Application Publication No. 2004/0243560 to Broder et al. (Broder) in view of Moffat et al., "Self-Indexing Inverted Files For Fast Text Retrieval," February 1994, 1994 Australian Database Conference and 1994 IEEE Conference on Data Engineering ("Moffat"); and rejected claims 8, 15, 31, 44, and 51 under 35 U.S.C. §103(a) as unpatentable over Broder in view of Moffat and further in view of U.S. Patent No. 5,838,950 to Young et al. (Young).

By this Amendment, Applicant amends claims 1, 15, 25, 37, and 51 to more clearly define features of the present invention.

Claims 1-6, 8-42, and 44-60 are currently pending.

Rejection under 35 U.S.C. §103(a)

The Examiner rejected claims 1-6, 9-14, 16-30, 32-42, 45-50, and 52-60 under 35 U.S.C. §103(a) as unpatentable over Broder in view of Moffat. Applicant respectfully traverses this rejection.

Claim 1, as amended, defines a method for indexing documents in a collection of documents using skip entries, each document comprising one or more index terms. The method includes, among other things, "determining a first value x representative of a first location for inserting a first skip entry in an inverted index, such that x is determined as an integer corresponding to a quantity of documents including at least a majority of the index terms." Claim 1 also includes "determining a second value y, where y does not exceed x, the second value y determined as an integer and

representative of a second location for inserting a second skip entry in the inverted index." Moreover, claim 1 includes "generating the inverted index for the collection of documents, the inverted index including an inverted list for each of the index terms, each inverted list including at least one posting and, if the number of postings exceeds x, further including the first skip entry inserted after the x^{th} posting and one or more second skip entries inserted thereafter at intervals of every y^{th} posting."

The Examiner alleges that Broder discloses at paragraphs 0307 and 0314 the following claimed feature of claim 1: "determining a first value x representative of a first location for inserting a first skip entry in an inverted index such that x is determined as an integer corresponding to a quantity of documents including at least a majority of the index terms." Applicant respectfully disagrees.

At the outset, Applicant submits that Broder fails to disclose or suggest a "skip entry." Instead of using skip entries, Broder uses a completely different approach based on an "iterator." Broder, paragraph 0307. The iterator enables jumping to a given entry in an index. Broder, paragraph. 0045, lines 4-7. However, that given entry is merely a document posting rather than a special type of entry like the skip entry. **As a consequence, Broder teaches away from the use of skip entries by using an "iterator."** Because Broder uses an iterator rather than a skip entry, Broder fails to disclose at least the following feature of claim 1: "determining a first value x representative of a first location for inserting a first skip entry in an inverted index, such that x is determined as an integer corresponding to a quantity of documents including at least a majority of the index terms."

The Examiner also alleges that paragraph 0277 of Broder discloses the following

feature of claim 1: "determining a second value y, where y does not exceed x, the second value y determined as an integer and representative of a second location for inserting a second skip entry in the inverted index." Applicant respectfully disagrees.

Broder at paragraph 0277 once again discloses an approach that implements an iterator rather than a skip entry. Indeed, Broder's index k has nothing to do with "skip entries." Instead, Broder describes so-called "rules for zipping." Moreover, there is no disclosure in Broder that requires Broder's "k" to not exceed the quantity of documents, which the Examiner appears to allege corresponds to the claimed value "x." For the Examiner's convenience, Applicant provides the following excerpt from Broder:

[0273] In terms of implementation, the use of (WAND) is somewhat similar to the implementation of AND. In some embodiments, the rules for "zipping" may be as follows:

[0274] The entire WAND iterator 1125 has a cursor CUR_DOC that represents the current match. It is desired to advance CUR_DOC.

[0275] Each pattern pat_i has an associated next_doc_i that represents where it matches in a position > CUR_DOC.

[0276] Sort all the next_doc_i so that next_doc.sub.--1 <= next_doc_i.sub.--2 <= next_doc_i.sub.--3 <= . . .

[0277] Let k be the smallest index such that w_i.sub.--1 + w_i.sub.--2 + . . . + w_i_k > w.sub.--0. Then claim that it is possible to advance CUR_DOC to next_doc_i_k, and advance all the other cursors to a position >= CUR_DOC. Now, if enough weight at CUR_DOC is available, then CUR_DOC is returned. Otherwise the positions are sorted again.

Broder, paragraphs. 0273-0277. In view of the foregoing, Broder fails to disclose or suggest the following feature of claim 1: "determining a second value y, where y does not exceed x, the second value y determined as an integer and representative of a second location for inserting a second skip entry in the inverted index."

The Examiner concedes that Broder does not explicitly disclose that "x is representative of a first skip entry in an inverted index; and that the second value y determined as an integer and representative of a second location of a second skip entry in the inverted index." Office Action, pages 3-4. To cure that significant gap in Broder's disclosure, the Examiner relies on Moffat at page 14, section 4.1. Although Moffat discloses a "skip," Moffat uses a skip place at fixed intervals (see, e.g., Moffat, page 15, first paragraph, "every three pointers") rather than a "first skip entry inserted after the xth posting and one or more second skip entries inserted thereafter at intervals of every yth posting," as recited in claim 1. As a consequence, Moffat fails to disclose at least the following features as recited in claim 1: "determining a first value x representative of a first location for inserting a first skip entry in an inverted index, such that x is determined as an integer corresponding to a quantity of documents including at least a majority of the index terms;" "determining a second value y, where y does not exceed x, the second value y determined as an integer and representative of a second location for inserting a second skip entry in the inverted index;" and "generating the inverted index for the collection of documents, ... further including the first skip entry inserted after the xth posting and one or more second skip entries inserted thereafter at intervals of every yth posting." Accordingly, neither Broder nor Moffat, whether taken along or in combination, discloses or suggests the above-noted features recited in claim 1, and thus the rejection under 35 U.S.C. §103(a) of claim 1 as well as claims 2-6 and 9-14, at least by reason of their dependency from independent claim 1, should be withdrawn.

Claims 15, 25, 37, and 51, although of different scope, includes features that are similar to those noted above for claim 1. Claims 16-24 depend from independent claim

15. Claims 26-36 depend from claim 25. Claims 38-42 and 44-50 depend from independent claim 37. Claims 52-60 depend from claim 51. For at least the reasons given above with respect to claim 1, claims 16-30, 32-42, 45-50, and 52-60 are patentable over Broder and Moffat, whether taken along or in combination, and the rejection of those claims under 35 U.S.C. §103(a) should be withdrawn.

Regarding the alleged motivation to combine Broder and Moffat, Applicant disagrees with the Examiner's alleged motivation to combine because a skilled artisan would not combine such divergent references. Specifically, Moffat uses an approach using skips while Broder **teaches away** from skips by using an iterator to iterate over the actual entries using a WAND function. As a consequence, a skilled artisan would not have combined such divergent approaches. The rejection of 1-6, 9-14, 16-30, 32-42, 45-50, and 52-60 under 35 U.S.C. §103(a) as unpatentable over Broder in view of Moffat should thus be withdrawn for this additional reason.

Moreover, Applicant submits that the Examiner has not made a showing that there is any reasonable expectation of success since Applicant doubts whether Broder's iterator, which relies on a specialized WAND function, would operate with Moffat's skip approach. A skilled artisan would not be able to combined such divergent approaches (or been motivated to do so). In view of the foregoing, the rejection of 1-6, 9-14, 16-30, 32-42, 45-50, and 52-60 under 35 U.S.C. §103(a) as unpatentable over Broder in view of Moffat should be withdrawn for this additional reason.

Rejection under 35 U.S.C. §103(a)

The Examiner rejected claims 8, 15, 31, 44, and 51 under 35 U.S.C. §103(a) as unpatentable over Broder in view of Moffat and Young. Applicant respectfully traverses

this rejection.

Claim 8 depends from claim 1 and includes all the features therein including, among other things, "determining a first value x representative of a first location for inserting a first skip entry in an inverted index, such that x is determined as an integer corresponding to a quantity of documents including at least a majority of the index terms;" "determining a second value y , where y does not exceed x , the second value y determined as an integer and representative of a second location for inserting a second skip entry in the inverted index;" and "generating the inverted index for the collection of documents, ... further including the first skip entry inserted after the x^{th} posting and one or more second skip entries inserted thereafter at intervals of every y^{th} posting." As noted above with respect to claim 1, neither Broder nor Moffat discloses at least these noted feature. Although Young discloses an adapter integrated circuit, Young fails to cure the noted deficiencies of Broder and Moffat. Accordingly, neither Broder, Moffat, nor Young, whether taken along or in combination, discloses or suggests these noted features, and thus the rejection of claim 8, under 35 U.S.C. §103(a) should be withdrawn.

Moreover, claim 8 further recites the following feature: "wherein x is selected from a first range of 256 to 512 and y is selected from a second range of 128 to 256, wherein y is not selected to have the same value as x ." The Examiner acknowledges that neither Broder nor Moffat discloses the noted feature. Office Action, page 20. To cure that gap, the Examiner relies on Young at col. 140, lines 30-43 for an alleged disclosure for the ranges 256 to 512 and 128 to 256. At the outset, Applicant submits that there is no disclosure at Young col. 140, lines 30-43 that has anything to do with

the ranges 256-512 and 128 to 256. Instead, Young at col. 140, lines 30-43 describes physical memory addresses. Moreover, Applicant fails to see why a skilled artisan would be motivated to modify Broder and Moffat based on Young, a reference directed to operating a host adapter in an integrated circuit — a very different field of art. In view of the foregoing, the rejection of claim 8 under 35 U.S.C. §103(a) should be withdrawn for this additional reason.

Claims 15, 31, 44, and 51, although of different scope, include features similar to those noted above with respect to claim 8. For at least the reasons given above with respect to claim 8, the rejection under 35 U.S.C. § 103(a) of claims 15, 31, 44, and 51 should be withdrawn.

CONCLUSION

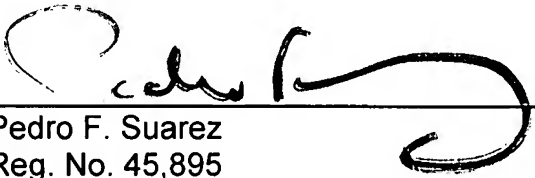
Applicant respectfully requests that this Amendment under 37 C.F.R. § 1.116 be entered by the Examiner. Applicant submits that the proposed amendments do not raise new issues or necessitate the undertaking of any additional search of the art by the Examiner. Therefore, this Amendment should allow for immediate action by the Examiner. Finally, Applicant submits that the entry of the amendment would place the application in better form for appeal, should the Examiner continue to dispute the patentability of the pending claims.

It is believed that all of the pending claims have been addressed in this paper. However, failure to address a specific rejection, issue or comment, does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above are not intended to be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

If there are any questions regarding these amendments and remarks, the Examiner is encouraged to contact the undersigned at the telephone number provided below. No fee is believed to be due, however, the Commissioner is hereby authorized to charge any fees that may be due, or credit any overpayment of same, to Deposit Account No. 50-0311, Reference No. 34874-165-UTL/2003P00147US.

Respectfully submitted,

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